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XIV.

E X P E R I M E N T S

O N T H E

D I P P I N G N E E D L E,

M A D E B Y D E S I R E O F T H E

R O Y A L S O C I E T Y.

B Y

T H O M A S H U T C H I N S.

R E D D E, F E B R U A R Y 16, 1775.

EXPERIMENTS ON THE DIPPING NEEDLE.

Stromnefs in the ifles of Orkney, lat. $58^{\circ} 59'$ North,
long. $3^{\circ} 30'$ West from London, June 9, 1774.

75	50	} The index placed Eaft.
76	0	
75	45	
75	45	
75	40	} The index placed Weft.
74	55	
75	0	
75	20	
75	25	} The poles of the needle changed, the index placed Weft.
75	25	
76	10	
76	15	
76	25	} The index facing the Eaft.
77	0	

In thefe obfervations the needle was placed horizontal, and the vibration continued between nine and ten minutes. The inftrument was fet in the middle of a room up one pair of ftairs; but being apprehenfive that the iron-grate, fender, poker, and tongs, might, in fome meafure, affect the needle, I determined to make a trial in the open air, and in a place free from fuch obftacles.

EXPERIMENTS ON THE DIPPING NEEDLE.

On the Holms in the entrance of Stromnefs Harbour,
June 23, 1774. Variation *per* azimuth 24° Westerly.
Long. from London $3^{\circ} 30'$ West, lat. $58^{\circ} 59'$ North.

76	0	}	The index placed West.
75	40		
75	45		
76	55	}	The index placed East.
76	10		
76	30		
74	45	}	The poles changed, and index East.
75	30		
75	0		
76	0	}	The index placed West.
74	45		
75	0		

The needle in all these observations was left to vibrate from an horizontal position. The instrument was set on the top of the case (in which it was packed) and stood in the open air, in a fine sunny day.

EXPERIMENTS ON THE DIPPING NEEDLE.

In Hudson's Straits, July 23, 1774, lat. $62^{\circ} 3'$ North,
long. 69° West from London, variation 43° Westerly.

82	50	}	The Index placed East.
82	30		
82	40		
81	50	}	The index placed West.
82	45		
83	45		
82	40		

The needle vibrated from an horizontal situation. These observations were made on a large piece of ice, to which the three ships were grappled. I imagine the first four experiments may be depended on, as it was calm weather; but afterwards, a breeze springing up gave the ice a circular motion, which made it impossible to keep the instrument exactly in the magnetic meridian, as may be seen in the fifth and sixth experiments. I re-adjusted the instrument for the last observation; but finding the ice still continued in motion, I judged it unnecessary to make any farther experiments at this time, as it could not be done with that exactness I could wish, or give satisfaction to the learned Society to whom I have the honour of transmitting these remarks.

EXPERIMENTS ON THE DIPPING NEEDLE.

In Hudson's Straits, July 27, 1774, lat. $62^{\circ} 23'$ North,
long. $71^{\circ} 30'$ West from London, variation $42^{\circ} 50'$
Westerly *per* azimuth.

o ,

81	45	}	The index placed East.
83	12		
82	12		

83	o	}	The index placed West.
82	45		
83	45		

83	30	}	The poles changed, and index West.
84	o		
83	35		

85	o	}	The index placed East.
83	25		
83	45		

I met with the same impediment as in the last trial of the instrument, the field of ice turning round, so as to remove the needle constantly out of the magnetic meridian; however, I endeavoured to be exact, and re-adjusted the position of the instrument twice during the observations.

EXPERIMENTS ON THE DIPPING NEEDLE.

In Hudſon's Straits, July 28, 1774, lat. $62^{\circ} 25'$ North,
long. $71^{\circ} 30'$ Weſt from London, variation *per* azi-
muth 44° Weſt.

- ° /
- | | | | |
|----|----|---|------------------------------------|
| 83 | ° | } | The index pointing Weſt. |
| 83 | ° | | |
| 83 | 30 | } | The index pointing Eaſt. |
| 83 | ° | | |
| 81 | 30 | } | The poles changed, and index Eaſt. |
| 81 | 40 | | |
| 82 | 8 | } | The index pointing Weſt. |
| 82 | ° | | |

Theſe obſervations were made with the aſſiſtance of Captain Richards, on a table in the cabbin of the Prince Rupert. We uſed all imaginary care to render them exact; yet, at the concluſion, I found the ſhip, though faſt to a field of ice, had altered the poſition of her head: for by placing the index to the North line of the inſtrument, the needle ſtood at $88^{\circ} 10'$ Weſt, inſtead of being perpendicular at 90° .

EXPERIMENTS ON THE DIPPING NEEDLE.

In Hudſon's Bay, Auguſt 14, 1774, lat. $56^{\circ} 53'$ North,
long. $85^{\circ} 22'$ Weſt from London, variation *per* azi-
muth 24° Weſt.

o	'	
82	o	} The index placed Eaſt.
82	o	
82	15	} The index placed Weſt.
82	20	
82	50	} The poles changed, and index Eaſt
82	35	
82	30	} The index placed Eaſt.
82	15	

Theſe experiments were made in conjunction with Captain Richards, in the cabin of the Prince Rupert, whilſt ſhe lay amongſt ice. The ſhip frequently varied the poſition of her head a point of the compaſs; but by replacing the inſtrument as often as we found occaſion, I have the greateſt reaſon to think theſe obſervations (which took up above three hours) are pretty accurate.

EXPERIMENTS ON THE DIPPING NEEDLE.

At Moofe Fort in Hudson's Bay, September 8, 1774, lat.
 $51^{\circ} 20'$ North, long. $82^{\circ} 30'$ West from London,
 variation 17° West.

80° 25'	}	The index placed West.
80 15		
80 35		
79 0		
80 30	}	The Index placed East.
81 25		
80 13		
81 13		
79 10	}	The poles reversed, index East.
80 45		
79 50		
79 10		
79 10	}	The index placed West.
80 25		
79 45		
80 5		

The observations were made on shore. So remarkable difference between them, when I was expecting quite the reverse, surprized me as much as the increased inclination of the needle from observations made nearly in the same parallel of latitude in London. I endeavoured, by drawing a magnetical meridional line with chalk, and paying the greatest attention to keeping the instrument perfectly steady and horizontal, to render these experiments accurate, and fulfil the intention of the Royal Society.

EXPERIMENTS ON THE DIPPING NEEDLE.

At Albany Fort in Hudson's Bay, September 14, 1774,
 long. $82^{\circ} 30'$ West, lat. $52^{\circ} 22'$ North, variation 17°
 West.

° /

80 13

80 25

79 37

79 55

I made a trial of the instrument at this place, but having lost the slip of paper on which I had noted the experiments, I was dubious whether I should insert the above or not. I can only recollect these four, and am not positive which way the index stood; however, I remember that the mean of all the observations I made was something less than 80° . Time will not permit me to repeat the operation during the ship's stay in these parts; I must therefore defer it to a future period. During the winter, I shall have frequent opportunities of amusing myself this way; and the respect I bear the Royal Society, makes every service I render to that illustrious body an additional happiness to

Their devoted servant,

Albany Fort,
 September 17, 1774.

THOMAS HUTCHINS

OBSERVATIONS ON HOY, 1774.

Month.	Hour.	Barometer.	Thermometer.	Weather.	Circumstances.
1774. June 11.	○ 15	28,63	59	Clear.	On the top of the hill.
	○ 30	28,60	56½	Foggy.	Ditto.
	4 15	30,22	63	Clear.	At low water mark.

Hoy is a remarkable high hill near Stromnefs, in the Orkneys, and is placed by Mr. MACKENZIE in lat. 58° 58' North, and long. 3° 30' West from London. The two first observations were made on the highest part of the hill. Soon after the first, a fog was seen below arising from the water, at length it reached the summit of the hill; the air seemed very raw and cold to the touch, and the instruments shewed as in the second observation. The barometer continued at 28,60 inches after the fog was gone off, but the thermometer rose two or three degrees. The last observation was made at low water mark, about half a mile from the bottom of the hill. THOMAS HUTCHINS.

“The height of Hoy above low-water mark, according to these observations should be 249,93 fathoms, or as near as may be 500 yards, neglecting the correction for the difference that may be supposed in the temperature of the quicksilver at the two stations, the quantity of which is uncertain.” S. HORSLEY.